

## CLAIMS

I/We claim:

1. A system for locating a marker associated with a subject comprising:  
an excitation source for emitting an exciting waveform during an excitation interval, said exciting waveform causing said marker to resonate;  
a sensing array including a plurality of sensing coils, said sensing coils collectively outputting a plurality of inputs; and  
a receiver for analyzing said plurality of inputs to identify and correct a phase shift from said plurality of inputs to implement a coherent receiver.
2. The system of Claim 1 wherein said receiver acts on said plurality of inputs gathered during an observation interval.
3. The system of Claim 2 wherein said receiver averages multiple sets of said plurality of inputs over a plurality of said observation intervals prior to coherent analysis.
4. The system of Claim 1 wherein said exciting waveform is a triangular waveform.
5. The system of Claim 1 wherein said excitation source and said sensing coil repeat the emission of said exciting waveform and outputting of said plurality of receiver inputs for a plurality of iterations, said receiver operative to average multiple sets of said plurality of receiver inputs over a plurality of said observation intervals from said plurality of iterations prior to coherent analysis.
6. The system of Claim 1 wherein said plurality of inputs are acquired when said excitation source is inactive.
7. The system of Claim 1 wherein said receiver includes a quadrature circuit.

8. The system of Claim 1 wherein said plurality of inputs are acquired when a radiation source is inactive.

9. The system of Claim 5 wherein said exciting waveforms are randomly dithered.

10. The system of Claim 1 wherein said phase shift is calculated based upon a least mean squares error of said plurality of inputs.

11. A method for locating a marker associated with a subject comprising:  
providing an excitation source for emitting an exciting waveform during an excitation interval, said exciting waveform causing said marker to resonate;  
providing a sensing array including a plurality of sensing coils, said sensing coils collectively outputting a plurality of inputs; and  
providing a receiver for analyzing said plurality of inputs to identify and correct a phase shift from said plurality of inputs to implement a coherent receiver.

12. The method of Claim 11 wherein said receiver acts on said plurality of inputs gathered during an observation interval.

13. The method of Claim 12 wherein said receiver averages multiple sets of said plurality of inputs over a plurality of said observation intervals prior to coherent analysis.

14. The method of Claim 11 wherein said exciting waveform is a triangular waveform.

15. The method of Claim 11 further including repeating the emission of said exciting waveform and outputting of said plurality of receiver inputs for a plurality of iterations, said receiver operative to average multiple sets of said plurality of receiver

inputs over a plurality of said observation intervals from said plurality of iterations prior to coherent analysis.

16. The method of Claim 11 wherein said plurality of inputs are acquired when said excitation source is inactive.

17. The method of Claim 11 wherein said receiver includes a quadrature circuit.

18. The method of Claim 11 wherein said plurality of inputs are acquired when a radiation source is inactive.

19. The method of Claim 15 wherein said exciting waveforms are randomly dithered.

20. The method of Claim 11 wherein said phase shift is calculated based upon a least mean squares error of said plurality of inputs.